



Healthy forests depend on balancing fire and water

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Chinese philosophy tells of yin and yang, two timeless forces that oppose yet complement each other to maintain the universe's harmony, influencing everything within it.

Nature has various examples of the concept, including fire and water, both of which can be destructive and beneficial. Like yin and yang, how fire and water interact — and which one reigns supreme, even for a short time — influences the destinies of plants, animals and people.

Fire at first might seem exclusively destructive. According to the National Interagency Fire Center, in 2018 more than 50,000 wildfires scorched more than 8.5 million acres across the United States. Verisk's 2017 Wildfire Risk Analysis reported losses from wildfires exceeded \$5 billion during the past 10 years.

To unravel exactly how fire influences moisture in burned soil, hydrologists and other environmental scientists at Los Alamos National Laboratory have developed a sophisticated computer model.

The initial experiment using the model indicated that that soil moisture generally increases following fire with the exception of high-severity-burn areas that experience greater surface runoff — the soil is much drier after a really intense wildfire. If heavy or frequent rainstorms follow a fire, the chance of flooding increases, but the soil winds up drier than it was before the fire, despite all that flowing water.

Wildfires will continue to be unpredictable, but advanced modeling software may one day predict water content in soil across a range of burn severities. That will give decision makers in government and industry better information to understand the risks to water resources.

It will also enable planners to develop more effective processes to reduce the risk of wildfires and influence the growth of more-desirable ecosystems.

The [full version of this story](#) first appeared in the Science on the Hill column in the Santa Fe New Mexican, which highlights Laboratory science.

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